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(21) International Application Number: PCT/GB98/00089 (22) International Filing Date: 12 January 1998 (12.01.98) (30) Priority Data: 9700415.4 10 January 1997 (10.01.97) GB 9720190.9 24 September 1997 (24.09.97) GB 9722527.0 25 October 1997 (25.10.97) GB (71)(72) Applicant and Inventor: HINTON, Gerald, Thomas [GB/GB]; Eastfield, Stonebyres, Lanark ML11 9UW (GB). (74) Agent: MURGITROYD & COMPANY; 373 Scotland Street, Glasgow G5 8QA (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: DETERGENT (57) Abstract The invention relates to laundering and dishwashing products which can be incorporated in a single compartment water soluble film sachet, the formulation comprising a granulated percarbonate compound which has been mixed with an encapsulating blend comprising sulphate, carboxy methyl cellulose and nonionic surfactant wherein the detergent product does not include zeolites and perborates.		

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1 "Detergent "

2

3 This invention relates to a detergent product
4 formulations which can be packaged in water soluble
5 film.

6

7 A product of the invention is ideally for use in the
8 laundering and conditioning of industrial and domestic
9 man-made and/or natural fabrics in semi-automatic or
10 automatic washing machines. It may also be used in
11 dishwashers. For convenience purposes it is useful if
12 this can be achieved by means of a soluble single
13 compartment sachet containing varying amounts of
14 bleaching detergents including for example sodium
15 percarbonate. Typically a sachet may be made from a
16 water soluble film such as PVA.

17

18 Conventional laundering detergents comprise perborates
19 and zeolites and these compounds are not stable in
20 water soluble film. Previous attempts have been made
21 to manufacture fully built detergent and conditioner
22 systems in a sachet have required a twin compartment
23 sachet manufactured from a perforated film. These
24 fully built detergent and conditioner systems generally
25 contain bleaching agents. Sodium percarbonate is

1 recognised in this field as a bleaching agent.

2 However, use of percarbonate in sachets is not popular
3 as it is unstable when combined with other components
4 of a high moisture content.

5

6 Twin compartment sachets have a disadvantage in that
7 they require greater mechanical action to dissolve the
8 sachet and thus have long dispersion times. Also, they
9 are expensive to manufacture.

10

11 Additionally, the perforated film used in these twin
12 compartment sachets does not confer a significant shelf
13 life to the components contained within the sachet,
14 wherein the oxidising power of the bleaching agent is
15 reduced.

16

17 Also, typically these formulations contain zeolites.
18 These have high moisture content which affects the
19 mechanical properties of the film e.g. the pliability.

20

21 It is an object of the present invention to provide a
22 detergent or bleaching agent for cleaning in laundries,
23 or in domestic washing machines or dishwashers which is
24 stable within a water soluble film.

25

26 According to the present invention there is provided a
27 granulated percarbonate compound suitable for use in
28 cleaning products wherein the percarbonate compound has
29 been mixed with an encapsulating blend.

30

31 Preferably the encapsulating blend comprises sulphate,
32 carboxy methyl cellulose and nonionic surfactant.

33

34 The invention further provides an encapsulation blend
35 comprising sodium sulphate, carboxymethyl cellulose and
36 a nonionic surfactant blend.

1 Suitably the surfactant is an alkyl (C₆ to C₁₂) aryl
2 polyglycol ethoxylate (phenol ethoxylate).

3

4 Suitably the percarbonate granules have a size of not
5 less than 150 microns.

6

7 The invention further provides a detergent formulation
8 comprising sodium percarbonate, carboxy methyl
9 cellulose, sodium sulphate, nonionic surfactant blend,
10 sodium silicate and sodium tripolyphosphate and not
11 including zeolites or perborates.

12

13 The detergent may further comprise at least one
14 ingredient chosen from the group comprising linear
15 alkylbenzene sulphonate, sodium carbonate, low foam
16 wetting agent, perfumes, cationic surfactant, optical
17 brighteners, salts, pigments and enzymes.

18

19 In one embodiment the detergent formulation is a
20 laundering product.

21

22 In an alternative embodiment the detergent is a machine
23 dishwashing product.

24

25 Suitably the laundry or dishwashing product according
26 to the present invention is packaged in PVA film. A
27 product of the invention is stable in PVA film compared
28 to other products containing zeolites and perborates.

29

30 Suitably the film is 20-80 microns thick.

31

32 The product may be incorporated into a tablet form.

33

34 The granulated form of percarbonate in the above
35 permits efficient bleaching action of the laundry
36 product whilst not effecting the stability of the

1 product in storage.

2

3 While modifications and improvements may be made
4 without departing from the scope of this invention, the
5 following is a description of the invention, with
6 reference to the accompanying diagram:

7

8 Figures 1a and 1b illustrate a soluble single
9 compartment sachet produced from a polyvinyl alcohol
10 (PVA) film filled with product and heat sealed.

11

12 Figures 2a and 2b illustrate a soluble single
13 compartment sachet produced from PVA film by
14 thermoforming.

15

16 The sachets are sealed such that they contain a laundry
17 and conditioning powder without spillage or air borne
18 contamination which can cause irritation to eyes and/or
19 skin etc.

20

21 Example 1

22

23 The laundry and conditioning powder can be in the form
24 of a super concentrate with a bulk density of not less
25 than 0.75kg/l. The laundry and conditioning powder is
26 preweighed and packed in 50g batches which is
27 sufficient to launder 4.5kg dry weight of mixed fibres
28 (normal soiling) in either hard or soft water
29 conditions.

30

31 In order to determine the storage and durability of
32 sachets containing laundry and conditioner, the sachets
33 were treated as follows:

34

35 1. Laundry and conditioner products including the
36 granulated percarbonate compound were sealed in

1 PVA sachets under atmospheric conditions and
2 stored in various temperatures.

3

4 2. Sachets containing the laundry and conditioner
5 products were sealed in a PVC container under
6 atmospheric conditions as stored at various
7 temperatures.

8

9 The samples of both 1 and 2 above were stored for nine
10 months whereupon they were added to separate washing
11 cycles. In both cases the samples were found to be
12 stable (both before use and after storage) with no
13 deterioration of the product or the sachet containing
14 the product.

15

16 Sachets were dissolved in cold water (20°C) using a
17 combination of water flow and mechanical agitation
18 whereupon sachets and contents were typically
19 completely dissolved with no residue within 90 seconds.

20

21 The polyvinyl alcohol film was 30-85 microns (+/- 10-
22 15%) thick. The polyvinyl alcohol film is both
23 biodegradable and nonhazardous.

24

25 The process for producing the sachets according to
26 figures 1a and b containing the dishwashing, laundry
27 and/or conditioner product requires a form filling
28 machine modified such that the sachet is produced with
29 a minimum number of folds and seals.

30

31 Alternatively thermoforming of film can be used to
32 produce filed sachets as illustrated in Figure 2.

33

1 Example 2

2

3 Typical detergent product formulations

4

5	Linear alkylbenzene sulphanate	0-5%
6	Sodium Percarbonate	1-15%
7	Carboxy Methyl Cellulose	1-5%
8	Sodium Sulphate Anhydrous	5-35%
9	Sodium Carbonate	0-35%
10	Nonionic Surfactant Blend	1-10%
11	Low Foam Wetting Agent	0-2%
12	Sodium Metasilicate	1-30%
13	Sodium Tripolyphosphate	1-30%
14	Perfumes	0-1.5%
15	Cationic Surfactant	0-5%
16	Optical Brighteners	0-1%
17	Salts	0.10%
18	Enzymes (blended)	0-5%
19	Copolymer	0-10%
20	Water Soluble Dye Pigment	0-2%

21

22 Minor ingredients as required.

23

24 Varying amounts of the above components may be used
25 depending on the type of product required, i.e. for
26 laundering, dishwashing or conditioning.

27

28 In the following examples nonionic surfactant blend and
29 low foam wetting agent are together referred to as
30 liquid blend.

31

1 Example 3

2

3 Laundry Product (1)

4

5 A laundering product was prepared and packaged in PVA
6 film.

7

8 The formulation consisted of

9

10	Linear alkylbenzene sulphate	1%
11	Sodium Percarbonate	5.1%
12	Carboxy Methyl Cellulose	1%
13	Sodium Sulphate Anhydrous	20%
14	Sodium Carbonate	28%
15	Liquid blend	2%
16	Sodium Metasilicate	20%
17	Sodium Tripolyphosphate	20%
18	Perfumes	0.8%
19	Cationic Surfactant	-
20	Optical Brighteners	0.5%
21	Salts	2%
22	Enzymes (blended)	1%

23

24 Example 4

25

26 Laundry Product (2)

27

28 A laundering product was prepared and packaged in PVA
29 film.

30

31 The formulation consisted of

32

33	Linear alkylbenzene sulphate	1.5%
34	Sodium Percarbonate	7.0%
35	Carboxy Methyl Cellulose	1.0%
36	Sodium Sulphate Anhydrous	18.0%

1	Sodium Carbonate	28.0%
2	Liquid blend	2.0%
3	Sodium Metasilicate	20.0%
4	Sodium Tripolyphosphate	15.0%
5	Perfumes	0.8%
6	Cationic Surfactant	-
7	Optical Brighteners	0.5%
8	Salts	5.0%
9	Enzymes (blended)	1.0%
10	Copolymer	1.0%
11		
12	Inclusion of copolymer improved redeposition.	
13		
14	Example 5	
15		
16	Machine Dishwashing Powder	
17		
18	A dishwashing powder was prepared and packaged in PVA	
19	film.	
20		
21	The formulation consisted of	
22		
23	Linear alkylbenzene sulphate	-
24	Sodium Percarbonate	5.6%
25	Carboxy Methyl Cellulose	1%
26	Sodium Sulphate Anhydrous	20%
27	Sodium Carbonate	Balance
28	Liquid blend	2-3%
29	Sodium Metasilicate	40%
30	Sodium Tripolyphosphate	20%
31	Perfumes	-
32	Cationic Surfactant	-
33	Optical Brighteners	-
34	Salts	5%
35	Enzymes (blended)	0.8%
36		

1 Production of Formulation

2

3 The percarbonate was added to the sachet as shown in
4 Figure 1 in the form of granules. These granules
5 comprised percarbonate, sulphate and carboxy methyl
6 cellulose in varying amounts together with a blend of
7 nonionic surfactants to create a binding agent. These
8 components were processed in order to produce a dust
9 free granule of a diameter not less than 150 microns.

10

11 In order to produce the granules a horizontal type
12 mixer was used. A liquid blend of the abovementioned
13 laundry components was added to the mixer from a high
14 pressure vessel incorporating an agitator. The liquid
15 blend was fed in at a pressure of 60 pounds per square
16 inch.

17

18 The finished granulated detergent is fully
19 biodegradable and has a stable pH range of 10-11, which
20 does not affect the PVA film stability as used in this
21 invention.

22

23 Trials have shown that using nonionic surfactants
24 comprising alkyl aryl polyglycol ethoxylates through
25 the alkyl group C₆₋₁₂ (typically C₈₋₁₀) is stable and
26 gives the best results even after storage in excess of
27 9 months.

28

29 A typical encapsulation blend is as follows:

30

31 Sodium Sulphate (Anhydrous)	5-98%
32 Carboxy Methyl Cellulose	1-25%
33 Nonionic Surfactant blends	1-40%

34

35 Alternative nonionic surfactant blends comprising
36 alcohol polyglycol ethoxylate oxide in the range of

1 0.5-5% have been used successfully.

2

3 The advantages of the invention and of the ways in
4 which the disadvantages of the previously known
5 arrangements are overcome include encapsulation of a
6 percarbonate with a powder/liquid blend forming a
7 granular product of suitable size and strength for use
8 in a hot or cold process.

9

10 A single component sachet sealed such that the
11 percarbonate does not decompose in the detergent
12 contained within the sachet.

13

14 Upon dissolution the PVA leaves no residues i.e. it is
15 fully dissolved.

16

17 No mechanical action is required to dissolve the PVA
18 film.

19

20 The encapsulation process extends the shelf life of
21 fully built detergent within the PVA sachet.

22

23 In the super concentrated form, a laundering
24 formulation normally requires 50g per 4.5kg (dry
25 weight) wash with normal soiling.

26

1 CLAIMS

2

3 1. A granulated percarbonate compound for use in
4 detergent products comprising percarbonate and an
5 encapsulating blend wherein the encapsulating
6 blend comprises sulphate, carboxymethyl cellulose
7 and nonionic surfactant.

8

9 2. A granulated percarbonate compound as claimed in
10 claim 1 wherein the percarbonate is sodium
11 percarbonate.

12

13 3. A granulated percarbonate compound as claimed in
14 claim 1 or claim 2 wherein the sulphate is sodium
15 sulphate.

16

17 4. A granulated percarbonate compound as claimed in
18 any of the preceding claims wherein the surfactant
19 is alkyl (C₆ to C₁₂) aryl polyglycol ethoxylate.

20

21 5. An encapsulating blend comprising sodium sulphate,
22 carboxy methyl cellulose and nonionic surfactant
23 blend for use in producing a granulated
24 percarbonate compound as claimed in any of the
25 preceding claims.

26

27 6. A detergent formulation comprising sodium
28 percarbonate, carboxy methyl cellulose, sodium
29 sulphate, nonionic surfactant blend, sodium
30 silicate and sodium tripolyphosphate and not
31 including zeolites and perborates.

32

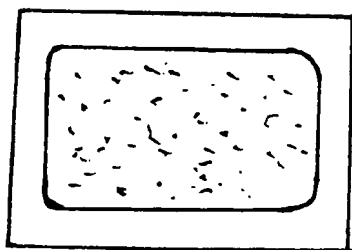
33 7. A detergent composition as claimed in claim 6
34 wherein the composition further comprises at least
35 one of the ingredients chosen from the group
36 comprising linear alkylbenzene sulphonate, sodium

- 1 carbonate, low foam wetting agent, perfumes,
2 cationic surfactant, optical brighteners, salts
3 and enzymes.
4
- 5 8. A detergent formulation is claimed in claims 6 or
6 7 wherein the detergent formulation is a
7 laundering product.
8
- 9 9. A detergent composition as claimed in claim 6 or
10 claim 7 wherein the detergent is a machine
11 dishwashing product.
12
- 13 10. A detergent composition as claimed in any of
14 claims 6 to 9 wherein the formulation is packaged
15 in PVA film.
16
- 17 11. A detergent formulation as claimed in claim 10
18 wherein the PVA film is 20-85 microns thick.
19
- 20 12. A detergent formulation as claimed in any of
21 claims 6-9 wherein the product is compressed into
22 a tablet format.

2/2

Fig 2

(a)



(b)

